Anesthesia for Eye Operations in the Aged

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• Aged persons appear to fear eye operations. Hence both patient and surgeon are more at ease with the use of a general anesthetic, particularly if the anesthetist has visited the patient before the operation and reassured him. Early ambulation, ordinarily so desirable in the aged, is curtailed in most eye operations because the head and eyes must be completely quiet. Since barbiturates are not well tolerated by aged patients, Dramamine is used instead preoperatively. Dramamine adequately sedates but does not cause depression or hallucinations. Morphine is contraindicated because of its pupillary action; Demerol is the drug of choice for preoperative medication.

Xylocaine applied directly to the pyriform fossa and vocal cords prevents laryngospasm, coughing and straining. Then, following induction with Pentothal, a Guedel airway is introduced into the oropharynx and through it a continuous flow of oxygen is maintained throughout the procedure. Relaxation of the eyelids is aided by the use of various muscle relaxants, succinylcholine being the relaxant of choice because it is rapidly eliminated. By administering narcotics intravenously during the course of the operation the amount of Pentothal needed can be held to a minimum. To prevent any slowing of the respiration, Nalline is administered in conjunction with the narcotic. In dealing with debilitated patients, Nalline is usually given in conjunction with the preoperative narcotic. Any latent slowing of the respiration can be promptly relieved by an additional dose of Nalline.

MOST OPERATIONS ON THE EYES of aged persons are elective cataract extraction or iridectomy. Since the operations are elective, the usual problems of the aged, such as nutritional deficiencies and cardiovascular, renal and liver disorders have in most cases been medically surveyed and corrected as far as possible before the patient is admitted to the hospital.

Most elderly patients appear to fear operations on the eyes as much as they do major abdominal operations. This fear may account for the fact that there is a steady increase in general anesthesia for eye operations. Many surgeons prefer general to local anesthesia. With the patient asleep the surgeon has no urge to hurry as he might if the patient were awake and becoming restive and uncooperative. Moreover, the patient is relieved of the emotional strain of facing the operation and of fear that he might not be cooperative (many suspect that most failures are caused by poor cooperation).

Care of elderly patients after operations on the eyes presents special problems. Postoperative procedures ordinarily carried out after other kinds of operation—early ambulation, leg exercise, frequent turning in bed and encouragement of cough—have to be foregone. After cataract removal, for example, the patient must lie quietly flat in bed for from two days to a week, and for at least three weeks after repair of a detached retina. Coughing, straining, gagging or sneezing must be avoided. In patients of the older age groups the success of operation depends more on the quality of preoperative preparation, the administration of anesthesia and postoperative care than on the operation itself.

PREOPERATIVE INTERVIEW

Elderly patients are accustomed to certain habits and surroundings and the change of environment upon entering the hospital often gives rise to apprehension. Frequently an anesthetist deals with a depressed and discouraged patient in preoperative interview and an optimistic approach to the problem is welcomed. In the preoperative visit one should never be hurried and the visit should be one of pleasure and reassurance to the patient. Aged persons are usually eager to disclose previous anesthetic difficulties, allergic sensitivities and intolerance to certain drugs. Much can be gained from careful attention to their remarks. Many are particularly concerned about the kind of anesthetic they are to receive. Complete frankness and full explanation of their anesthetic problem is both desired and appreciated. They should be assured that there will be little discomfort or pain following the operation.

As a rule there is no need for preoperative sedation, but if it is needed codeine may be given. (To be certain the patient is not sensitive to codeine, a test dose of 30.0 mg. is given.) As Demerol® is administered both before and during operation, inquiry should be made regarding sensitivity to it. The pa-

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tient should be assured that although he will be awake on going to the surgery, preoperative medication will give a feeling of complete indifference and he will be calm and cooperative.

For sedation the night before operation, either Nembutal® or Seconal® is given in 50 to 100 mg. dosage. Since aged patients do not tolerate barbiturates well, they should not be given preoperatively the day of operation. Dramamine® instead is very effective; it does give rise to some drowsiness but does not cause hallucinations or respiratory depression and it reduces the incidence of nausea and vomiting.[11] With Dramamine the patient arrives in surgery awake, stolid and indifferent. Dramamine thereby meets one of the chief requirements of operations on the eyes in the aged—that of having the patient adequately sedated but not depressed. The dose of Dramamine is 50 to 100 mg. If administered orally it is given two hours before operation; if parenterally, it is given along with Demerol and atropine one hour before operation. Demerol, the narcotic of choice, is administered in 50 mg. dosage. Morphine is contraindicated for patients having cataracts removed because its pupillary action often counteracts the dilating effect of homatropine or Neo-Synephrine® and thus delays operation.

It is important to prevent straining, coughing, gagging and vomiting both during and after operation. The most effective means of accomplishing this is to anesthetize the sensory nerve ends of the larynx. This can be done in numerous ways and with a variety of anesthetic agents but the most consistent results have been obtained with topical application of 2 per cent Xylocaine solution. With the use of laryngeal forceps the solution is applied directly to the pyriform fossa and the vocal cords. The best indication that the anesthetic solution has been properly placed is difficulty in initiating the act of swallowing.

In order that the surgeon's access to the operative field may be unimpaired, it is customary to introduce the tube for intravenous drip at the wrist, the elbow or the ankle. Anesthetic solutions are then injected in the rubber tube portion of the intravenous set.

Pentothal sodium in 2 or 2.5 per cent solution is the agent used for induction of anesthesia. As soon as the patient is asleep the lower jaw relaxes, which, with the face of the patient straight up as it must be for operations on the eye, usually partially or completely obstructs the airway. A Guedel airway lubricated with 5 per cent Xylocaine ointment is therefore introduced into the oropharynx; with slight extension of the head, the airway then will be patent.

The multiple drapes used in eye operations completely cover the face with the exception of the operative field. To insure adequate oxygen and prevent accumulation of carbon dioxide beneath the drapes, a continuous flow of oxygen at a rate of 3 to 4 liters per minute is supplied by inserting a rubber catheter into the Guedel airway. This may stimulate laryngeal reflexes with resulting spasm, coughing or gagging if the topical anesthesia is inadequate.

Good relaxation of the eyelids and a quiet eye are required in eye operations. Some surgeons prefer blocking the seventh nerve, by either the Van Lint or the O'Brien method, for this purpose. Excellent relaxation of the lids and elimination of ocular movement can be obtained, however, by using one of the several muscle relaxants. The special value of the muscle relaxants lies in the selective sequence of muscle paralysis—the muscles of the eyes and lids first. Judicious use of a muscle relaxant not only eliminates the squeezing of the lids and movements of the eye but reduces intraocular tension. There is considerable variation among persons in sensitivity to the various muscle relaxants.[8] The only way to determine the effect of a given relaxant upon a patient is to observe the effects of the initial dose and the first supplementary dose. Succinylcholine is the drug of choice for this purpose in eye operations, for it acts quickly and any untoward effect is apparent within one or two minutes. Moreover, owing to rapid enzymatic hydrolysis of the drug, unwanted effect will abate within two to five minutes. Succinylcholine is administered by continuous drip at a speed that will maintain adequate lid relaxation with little respiratory depression.

In aged persons the amount of Pentothal® needed for induction and maintenance of anesthesia is almost impossible to predict. Even with small intermittent doses which are presumably metabolized rapidly there is such a wide variance in response that sometimes it takes a long time for even small doses to be eliminated. For the purpose of reducing the amount of Pentothal needed it has become a common practice to administer morphine or some comparable narcotic intravenously during the course of the operation. This intravenous opiate usually causes so much slowing of the respiratory rate that often it becomes necessary to assist respirations to insure adequate oxygenation. The slowing of respiration induced by morphine or similar opiate can be relieved by the administration of N-Allyl-normorphine (Nalline®).[2] When Nalline is administered before or in conjunction with the narcotic respiratory depression is prevented.[5, 6] Nalline probably displaces the opiate from certain receptors in the respiratory center in a competitive fashion.[6, 9] Although Nalline itself is slightly depressant to the respiratory center it is less so than morphine or similar opiates.[12] Displacement of the opiate by Nalline immediately eliminates the characteristic slowing effect of the opiate on the respiratory rate[2] and increases the sensitivity of the respiratory center to carbon dioxide.[3, 4] The increased concentration of carbon dioxide in the

blood stimulates the respiratory rate above normal for a few moments until the carbon dioxide is reduced toward a more physiologic level; then respiration becomes normal and remains normal.[5, 10] Nalline does not cause significant changes in blood pressure or pulse rate. It does not alter arterial oxygen content but does cause pronounced decrease in arterial carbon dioxide content.[10] The displacement action of Nalline is as effective with the derivatives of morphine — meperdine (Demerol), methadon (Dolophine®) and methorphian (Dromoran®) — as it is with morphine itself.[1, 7] It has no effect on the respiratory depression caused by Pentothal.[5, 6, 7]

Nalline is administered in conjunction with the opiate. It is prepared in the following manner: Nalline 10 mg. and Demerol 100 mg. (or morph sulphate, 15 mg.) are combined and diluted to a total of 10 cc. This mixture is administered intravenously in the amount desired. With patients aged 70 or older it is a common practice to administer 50 mg. of Demerol and 5 mg. of Nalline. Both Nalline and the opiate are usually eliminated in three to four hours but it must be kept in mind that in aged persons the narcotic elimination may be delayed, with resulting characteristic slowing of the respiratory rate. In a series of over 700 cases observed by the author there was one instance of delayed respiratory depression.

There is a considerable variation in response to narcotics in the aged, and sometimes when the Nalline-opiate mixture is administered to a person who already has received other drugs, slowing of the respiratory rate may occur. Additional Nalline will increase respirations. In this series there was no change made in the ratio of Nalline to opiate. Less Nalline might be as effective. With the one exception more Nalline was not needed.

The lethal dose of Nalline in man has not been clearly determined, but it is suggested that not more than 40 mg. should be administered in a single dose. The largest single dose administered in this series was 10 mg.

The author has observed 388 cases in which persons 70 years of age or older were given a Nalline-Demerol mixture for anesthesia during operations on the eyes. It was very satisfactory. Side effects were minimal. There was no increase in nausea or vomiting. Use of the mixture reduced the use of Pentothal, which decreased postoperative sleeping time.

It has long been believed that large therapeutic doses of narcotics are contraindicated for aged persons. It would appear that the concept of restricting the use of narcotics in the aged must be reevaluated in the light of the present experiences with the use of a Nalline-opiate mixture.

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REFERENCES

1. Bornstein, M., Yorburg, L., and Johnston, B.: N-allylnormorphine in treatment of methorphian (Dromoran) hydrobromide poisoning, J.A.M.A., 151:908-910, March 14, 1953.

2. Dripps, R. D., and Comroe, J. H., Jr.: Clinical studies on morphine; immediate effect of morphine administered intravenously and intramuscularly upon respiration of normal man, Anesthesiology, 6:462-468, Sept. 1945.

3. Dripps, R. D., and Dumke, P. R.: Effect of narcotics on balance between central and chemoreceptor control of respiration, J. Pharmacol. and Exper. Therapy, 77:290-300, March 1943.

4. Dumke, P. R., and Dripps, R. D.: Influence of anesthetics on balance between chemoreceptor and central control of respiration, Fed. Proc., 1:150, March 1942.

5. Eckenhoff, J. E., Elder, J. D., and King, B. D.: Effect of N-allyl-normorphine in treatment of opiate overdose, Am. J. M. Sc., 222:115, July 1951.

6. Eckenhoff, J. E.: Elder, J. D., and King, B. D.: N-allylnormorphine in treatment of morphine or Demerol narcosis, Am. J. M. Sc., 223:191-193, Feb. 1952.

7. Eckenhoff, J. E., Hoffman, G. L., and Dripps, R. D.: N-allyl-normorphine: antagonist to opiates, Anesthesiology, 13:232-251, May 1952.

8. Foldes, F. F., Machaj, T. S., Hunt, R. D., McNall, P. G., and Carberry, P. C.: Synthetic muscle relaxants in anesthesia, J.A.M.A., 150:1559-1566, Dec. 20, 1952.

9. Hart, E. R.: Further observations on antagonistic actions of N-allyl-normorphine against morphine, Fed. Proc., 2:82, March 1943.

10. Landmesser, C. M., Cobb, S., and Converse, J. G.: Effects of N-allyl-normorphine upon the respiration depression due to morphine in anesthetized man with studies on the respiratory response to carbon dioxide, Anesthesiology, 14:535-549, Nov. 1953.

11. Millett, D. K., and Henry, M. O.: Prevention of postanesthetic nausea with dimethydrinate (Dramamine), Minn. Med., 34:1096-1097, 1114, Nov. 1951.

12. Unna, K.: Antagonistic effect of N-allyl-normorphine upon morphine, J. Pharm. and Exper. Therapy, 79:27-31, Sept. 1943.